Cole Franks

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EDUCATION

Rutgers, the State University of New Jersey
Department of Mathematics
Doctoral Candidate, 2013-present
Advisor: *Michael Saks*
Qualifying Syllabus: *Combinatorics, graph theory, probabilistic methods, and complexity*

University of South Carolina
Bachelor of Science in Mathematics and Physics, 2013

RESEARCH INTERESTS

I am interested in discrete math and theoretical computer science. Currently I am working in discrepancy theory and algorithmic aspects of invariant theory.

RESEARCH PAPERS

Preprints

1. Cole Franks and Michael Saks. "On the discrepancy of random matrices with many columns." (2018) Submitted, Preprint: https://arxiv.org/abs/1807.04318

Publications

1. Peter Bürgisser, Cole Franks, Ankit Garg, Rafael Oliveira, Michael Walter, Avi Wigderson. "Efficient algorithms for tensor scaling, quantum marginals and moment polytopes." Accepted, *2018 IEEE 59th Annual Symposium on Foundations of Computer Science*, Preprint: https://arxiv.org/abs/1804.04739
2. Cole Franks. "Operator scaling with specified marginals" In *Proceedings of the 50th Annual ACM SIGACT Symposium on Theory of Computing*, pp. 190–203. ACM, 2018. DOI: https://doi.org/10.1145/3188745.3188932, Preprint: https://arxiv.org/pdf/1801.01412.pdf
3. Cole Franks. "The delta squared conjecture holds for graphs of small order." *Involve, a Journal of Mathematics* 8(4) (2015), pp. 541 – 549. DOI: https://doi.org/10.2140/involve.2015.8.541, Preprint: http://sites.math.rutgers.edu/~wcf17/images/DeltaSquaredSmall.pdf
4. Corey Dunn, Cole Franks, Joseph Palmer. "On the structure group of a decomposable model space" *Beiträge zur Algebra und Geometrie* 56(1) (2015): pp. 199–216, DOI: https://doi.org/10.1007/s13366-013-0185-z, Preprint: https://arxiv.org/abs/1108.2224v3
5. Philip Chodrow, Cole Franks, Brian Lins. "Upper and lower bounds for the iterates of order-preserving homogeneous maps on cones" *Linear Algebra and its Applications* 439(4) (2013): pp. 999–1005, DOI: https://doi.org/10.1016/j.laa.2012.09.023, Preprint: https://arxiv.org/abs/1205.7003

TALKS

1. *Efficient algorithms for tensor scaling, quantum marginals and moment polytopes*, FOCS 2018
2. *Operator scaling with specified marginals*, STOC, 2018
3. *On the discrepancy of random matrices with many columns*, CMO BIRS workshop: Analytic techniques in theoretical computer science, 2018
4. *Efficient algorithms for tensor scaling, quantum marginals, and moment polytopes*, CWI Networks and optimization interest group seminar, 2018

AWARDS

1. School of Arts and Sciences Excellence Fellowship, Rutgers, 2016-2018
2. Academic Achievement Award, Rutgers, 2015
3. DoD National Defense Science and Engineering Graduate Fellowship, 2013-2016
4. Physics Rising Senior Award, University of South Carolina, 2012
5. Thomas Markham Mathematics Scholarship, University of South Carolina, 2012
6. Barry Goldwater Scholarship, 2012
7. Cary K. Smith Jr. Mathematics Scholarship, University of South Carolina, 2011
8. Carolina Scholarship, University of South Carolina, 2009-2013

TEACHING

1. **Math 454: Combinatorics**
   Instructor, Summer 2017
2. **Math 151: Calculus I for Math and Physics**
   Teaching Assistant, Fall 2016

INTERNSHIPS AND RESEARCH

1. **Research Intern, Microsoft Research Lab India, Bangalore, 2016**
   Smoothed analysis of tensor decompositions
   Mentor: Navin Goyal
2. **NSF REU, California State University, San Bernardino, 2011**
   Algebraic curvature tensors
   Mentor: Corey Dunn
3. **NSF REU, College of William and Mary, 2010**
   Matrix Analysis
   Mentor: Brian Lins

SERVICE

1. Coorganizer, Theory of Computing Reading Seminar, 2017-present
2. Organizer, Quantum Computing Reading Group, 2018-present
3. Referee, SODA 2018
4. Johns Hopkins Center for Talented Youth Combinatorics Session, 2017
   Tic Tac Toe on Affine and Projective Planes, with Keith Frankston
5. Directed Reading Program, Combinatorics, Spring 2016
   Mentee: Jingchen Liang
6. Mathematics tutor, University of South Carolina, 2011
7. Mathematics tutor, Dreher High School, 2010-2013